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WATER SUPPLY AND WATER QUALITY CONTROL STUDY. WEISNER RIVER DIVISION COUNCIL AND MAIN WEISNER UNITS. SOUTHWEST IDAHO WATER DEVELOPMENT PROJECT, IDAHO

Federal Water Pollution Control Administration
Portland, Oregon

June 1966

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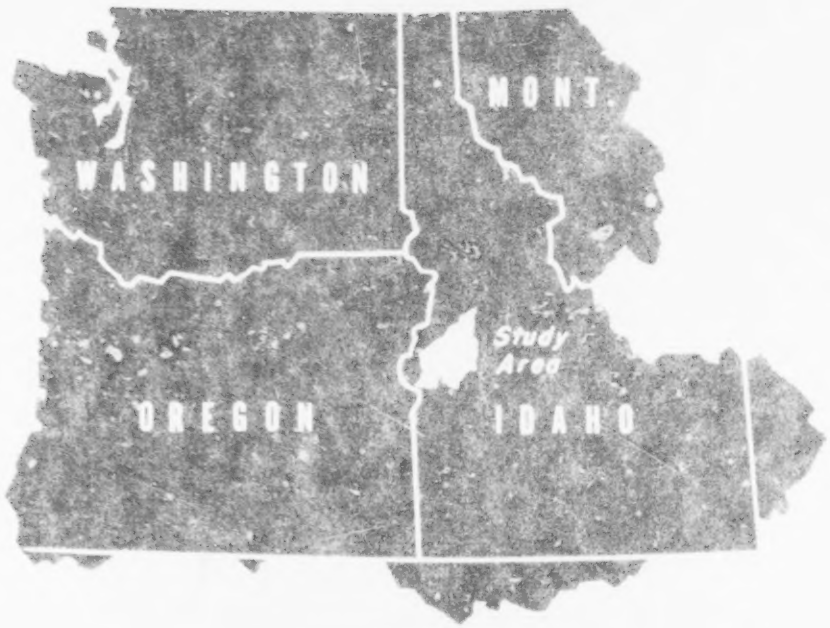

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UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration

WATER SUPPLY AND WATER QUALITY CONTROL STUDY

W E I S E R R I V E R D I V I S I O N
C O U N C I L A N D M A I N W E I S E R U N I T S
SOUTHWEST IDAHO WATER DEVELOPMENT PROJECT, IDAHO

A study of present and potential water needs for municipal and industrial water supply and storage needs for streamflow regulation for water quality control has been made. The study reveals a need for additional developments to meet future municipal and industrial water needs and recommends that existing streamflow of no less than ten cubic feet per second be reserved for water quality control. These conclusions are based on economic, demographic, and engineering studies. Future water requirements and quality projections are based on projected population and industrial growth.

P r e p a r e d a t t h e R e q u e s t o f t h e

Regional Director, Regional Office, Region 1
U. S. Bureau of Reclamation, Boise, Idaho

B y t h e

U. S. DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
Northwest Region, Portland, Oregon

June 1966

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I. INTRODUCTION

A. Request and Authority

The request for this report was made by the U. S. Bureau of Reclamation, Regional Office, Region I, Boise, Idaho, in a letter dated June 20, 1962. The request was for an evaluation of municipal and industrial (M&I) water supply and water quality control requirements and for an estimate of benefits that might be derived through releases from storage for those purposes. In a letter dated September 27, 1963, the Bureau of Reclamation indicated that storage needs and project benefits associated with water requirements for municipal and industrial supply would be evaluated by that agency and that this aspect of the evaluation need not therefore, be included in the study.

Authority for the investigation and report is the "Federal Water Pollution Control Act", as amended (33 U.S.C. 466 a(b)).

B. Purpose and Scope

This investigation was undertaken by the Federal Water Pollution Control Administration to determine the potential need for municipal and industrial water supply and the need for and value of storage in the proposed Southwest Idaho Water Development Project, Weiser River Division, Council and Main Weiser Units, Idaho, for water quality control. Water requirements were examined for areas within Washington and Adams Counties, Idaho. Future needs were projected to the year 1980, 2000, and 2020. An economic base study and forecast of future population and industrial growth was prepared for this purpose and is summarized in this report.

An earlier report to the Bureau of Reclamation dated March, 1963, included only the Main Weiser Unit of the Weiser Division of what is now the Southwest Idaho Water Development Project. The present report is largely a revision of the earlier report, modified to include consideration of the Council Unit.

C. Acknowledgments

This study was aided materially by officials of the municipalities within the area, the Idaho State Department of Health, the U. S. Geological Survey, and the U. S. Bureau of Reclamation, Regional Office, Region I, Boise, Idaho.

II. SUMMARY of Findings and Conclusions

A. Summary of Findings

1. The Bureau of Reclamation's proposed Council and Main Weiser Irrigation Units are located in the Weiser River Basin in southwestern Idaho. Reservoir sites included in the proposed plan are Monday Gulch, located on a small tributary to the Little Weiser River, and enlargement of existing Lost Valley Reservoir, located on Lost Creek upstream from the Community of Council.

2. The proposed Monday Gulch Reservoir would have a total storage capacity of about 35,000 acre-feet. Lost Valley Reservoir would be enlarged from its present capacity of 10,000 to about 30,000 acre-feet. In addition to irrigation, the project would serve needs for flood control, fish and wildlife, and recreation.

3. Three major reservoirs (with a total active storage capacity of about 70,000 acre-feet) exist in Weiser River Basin at the present time. These are Crane Creek, C. Ben Ross, and Lost Valley Reservoirs. Extensive diversions from stored water and natural streamflow are made for irrigation purposes. However, minimum flows have been greater than 20 cubic feet per second (cfs) in those reaches receiving waste effluents from municipal sources.

4. The 1960 population of the Weiser River Basin was 8,936, of which 5,761 resided in the towns of Weiser, Midvale, Cambridge, and Council and 3,175 resided outside of these communities. Weiser River Basin's economy is based largely on agriculture, although some logging is carried out in Payette National Forest. Agriculture provided 31.3 percent of the total 1960 employment and may be presumed to be the principal source of support for service industries.

5. The Midvale, Cambridge, and Council areas presently use ground water for municipal and industrial (M&I) water supply. Weiser presently uses ground water for M&I purposes, with water from the Snake River available as an auxilliary supply. The present demand at Weiser is about 0.5 million gallons per day (mgd). The present water demand for the study area is about 1.0 mgd, and ground water supplies are available in adequate quantity and quality, except at Weiser where operational problems (sand influx to wells) occur during summer demand periods.

6. Available data indicate that mineral and organic quality of waters in upper basin areas is sufficient to serve all existing uses. Surface waters in lower reaches of Weiser River would require treatment by filtration and chlorination, with provision for taste and odor control where necessary, if utilized for M&I supply.

7. According to presently available information, waste loadings to the Weiser River in terms of bio-chemical oxygen demand total about 1,000 population equivalents (PE) per day. The waste treatment program of the Idaho State Department of Health includes removal of suspended and colloidal solids (secondary waste treatment) for the Cities of Midvale, Cambridge, and Council which now provide treatment mainly for removal of floating and settleable solids (primary treatment).

B. Conclusions

1. The Weiser River Basin's economy will continue to be supported primarily by agriculture, logging, and limited manufacturing of wood products. The proposed irrigation development will add some stimulus to economic growth.

2. Population growth in the study area will occur mainly in the incorporated communities. Basin populations projected to the years 1980, 2000, and 2020 are 9,600, 10,900, and 12,600, respectively. About 70 to 75 percent of this population is expected to reside in urban areas.

3. The average demand for water for M&I purposes in urban areas is projected to be 2.0 mgd by the year 2020. Existing ground water sources will continue to adequately satisfy the region's M&I water needs for the period of this study except at Weiser where detailed engineering studies are needed to solve present and future operational and shortage problems.

4. The waste loads to Weiser River after adequate waste treatment is provided at all municipalities--85 percent biochemical oxygen demand (BOD) removal--are projected to be 250 PE by 1980, 290 PE by 2000, and 330 PE by 2020.

5. A minimum streamflow of 10 cfs will be needed to assimilate waste loads of the magnitude expected by the year 2020. This flow, with the aid of atmospheric reaeration, would insure dissolved oxygen (DO) in the stream at a level of 7 milligrams per liter (mg/l) which is the level needed to preserve fish life, recreational opportunities and attractiveness of the stream.

6. Natural flow is available in the Weiser River in amount sufficient to maintain adequate water quality. Plans for Weiser Division should recognize the need to maintain at least 10 cfs in the river at all times, particularly in the reach from Council downstream to Galloway Diversion Dam (Schematic Diagram, p. V-2).

7. With adequate waste treatment, storage will not be needed in Lost Valley Reservoir or the proposed Monday Gulch Reservoir for regulation of streamflow for water quality control within the period of this study. Any regulation of the river which would reduce minimum flows below 10 cfs would result in negative water quality benefits equivalent in valve at least to single-purpose storage costs involved in replacing the shortage. Should such shortage occur as a result of Weiser Division development, costs for replacement would be chargeable to the Project.

8. The Bureau of Reclamation has indicated that with both units of the proposed project in operation, minimum streamflow will continue to exceed 10 cfs. Therefore, adequate water quality can be maintained in the Weiser River without specific provisions for quality control regulation in the project.

III. PROJECT DESCRIPTION

A. Location

The Bureau of Reclamation's proposed Council and Main Weiser Irrigation Units are located entirely within the Weiser River Basin in Adams and Washington Counties, Idaho. The proposed Monday Gulch Dam and Reservoir would be located on a small tributary to the Little Weiser River in the Little Weiser River Watershed. The existing Lost Valley Reservoir is located on Lost Creek approximately 12 miles north of Council, Idaho (see Location Map, back cover).

The Weiser River originates in the Little Salmon Mountains at elevations around 8,000 feet about 50 miles north of Weiser. The river flows in a southerly direction through Council, Cambridge, Midvale, and Weiser, Idaho, and enters the Snake River at River Mile (RM) 351.8. The Weiser River drains an area of 1,660 square miles.

Streamflow records show a mean annual flow in the Weiser River near Council (RM 64.2) of 423 cfs or 306,200 acre-feet (1937-1952) and near Cambridge (RM 50.3) a mean annual flow of 659 cfs or 477,100 acre-feet (1939-1960). The recorded minimum daily flows for the Weiser River near Council and Cambridge are 22 cfs (June 29, 1940) and 23 cfs (October 1, 1943), respectively.

Water quality in the upper areas of the Weiser River Basin above Council is essentially unimpaired due to the absence of organic waste loadings and insignificance of irrigation in this area.

During the late summer months, irrigation return flows constitute the only flow in Weiser River below the Galloway Diversion Canal (RM 3.2). Quality data are not available on stream waters below Galloway Diversion Dam.

Irrigation return flows may degrade water quality in Weiser River as minerals are leached from irrigated lands. Studies conducted in the Yakima River Basin, for instance, indicate that significant algal and other aquatic growth has been stimulated in the lower reaches of the river by nutrients contained in irrigation return flows.

The Community of Weiser recently investigated the use of Weiser River for M&I water supply. The City concluded that the variability of water quality, due to algal growths and other factors, made ground water development more desirable.

B. Proposed Project

The Bureau of Reclamation's Southwest Idaho Water Development Project, Weiser River Division, Main Weiser and Council Units (see Location Map, back cover) would provide additional water resource development within the Weiser River (subbasin of the Central Snake River Basin) for the primary purposes of irrigation, flood control, fish and wildlife, and recreation. Included in the project are:

(1) The proposed Monday Gulch Dam and Reservoir (35,000 acre-feet);

(2) Two diversion dams on the Little Weiser River;

(3) Enlargement of existing Lost Valley Reservoir from 10,000 to about 30,000 acre-feet or alternate storage at Price Valley site;

(4) A diversion dam on West Fork Weiser River; and

(5) Several pumping plants, canals, and distribution systems to serve 18,060 acres of new land and 3,560 acres of presently irrigated land.

IV. STUDY AREA DESCRIPTION

A. Location and Boundaries

For purposes of this report, the study area consists of those portions of Washington and Adams Counties, Idaho, lying within the Weiser River Basin drainage area. The major towns within the study area are Weiser, Midvale, Cambridge, and Council, Idaho (see Location Map, back cover).

The economic base study area for this report is composed of nine 1960 Census of Population Districts in the Weiser River Basin--West Weiser, East Weiser, Middle Weiser, Weiser, Mann Creek, Midvale, Cambridge, Goodrich, and Council. These political divisions correspond very closely to the physical boundaries of the Weiser River Division.

B. Physical Features

1. Geology and Soils

The Weiser River rises in the metamorphosed lava and pyroclastic rocks of the Little Salmon Mountains and, throughout most of its course, flows through an area underlain by basalt of Miocene age. The western boundary of the drainage basin is formed by the southern part of the Seven Devils uplift. The mountainous area bordering the Weiser Basin is chiefly granite. The northern area is overlain by several thousand feet of basalt made up of many separate thin flows lying in almost horizontal beds. The Payette formation, predominant in the southern portion of the basin, consists of sedimentary lake-bed deposits alternated with lenses and thin layers of basaltic lava. The granite is deeply weathered and in large areas has disintegrated into a coarse, sandy soil poorly adapted to irrigation farming. Soils along the valley floor are very fertile. On the benches or flats over the basalt flows, the soil is rich and has a good gravel sub-soil drainage.

2. Cover Vegetation

The upper reaches of the basin are forested, but the lower basin is primarily agricultural land.

3. Topography

The elevation of the Weiser River Basin ranges from about 8,000 feet in the mountainous portion to about 2,000 feet at the confluence of Weiser River with the Snake River. Rolling hills and small valleys predominate along the stream courses.

4. Climate

The area's climate is semi-arid, with annual precipitation varying from about 12 inches at Weiser to about 27 inches near Council and more than 40 inches in the headwaters area. The precipitation, however, occurs unevenly during the year, the major portion occurring during the winter months as snowfall. During the long growing season (about 160 days), precipitation averages 2 to 5 inches, depending upon the elevation.

The average annual temperature is about 50°F. Range of temperature through the year is broad, with July averages of 75°F and January averages of about 29°F. Weiser temperatures become progressively cooler as elevation increases. Diurnal fluctuations are not extreme in the lower portions of the basin.

V. WATER RESOURCES of the Study Area

A. Surface Water

The Weiser River drains about 1660 square miles, developing a mean annual runoff of 724,000 acre-feet. Most of this runoff is developed in the headwaters. The 390 square miles of drainage area above the town of Council provide an average runoff of 306,200 acre-feet, and at Cambridge, 605 square miles develop a mean 477,100 acre-feet of annual runoff.

Three reservoirs in the basin have a total active storage capacity equal to slightly over a sixth of the average runoff as shown below:

Reservoir	Storage (acre-feet)
Crane Creek	51,700
C. Ben Ross	7,600
Lost Valley	10,000

The numerous small tributary valleys of the basin have influenced resource development toward small, scattered irrigation developments, and streamflows are largely committed to irrigation. Under the present level of water management, irrigation return flows constitute the only flow in the Weiser River below the Galloway Diversion Canal during the average August and September.

Quality of the water of the Weiser River is excellent, both in terms of uses which it may be expected to serve, and in terms of comparison with the waters of other river systems tributary to the southern sweep of the Snake River. Sampling by the U. S. Geological Survey during 1958-1959 indicated total dissolved solids in the upper reaches of the Weiser River were below 100 ppm and slightly over 100 ppm near the mouth. Biological quality of the water near the mouth was tested in 1961, incidentally to a survey of Snake River Water quality. Pertinent water quality data obtained on this survey is shown in TABLE V-1.

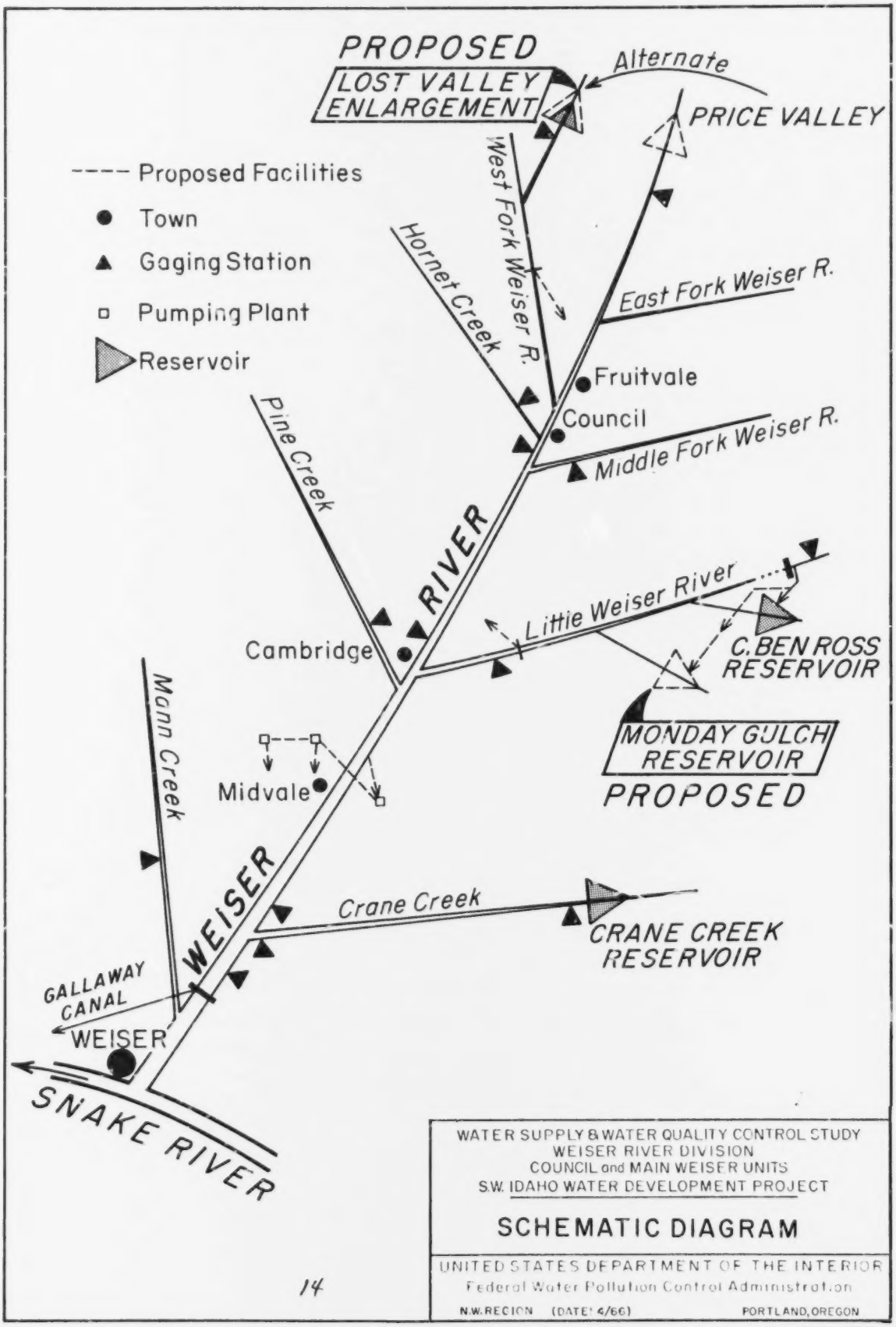

PROPOSED
LOST VALLEY
ENLARGEMENT
Alternate
PRICE VALLEY
Proposed Facilities
Town
Gaging Station
Pumping Plant
Reservoir
West Fork Weiser R.
Hornet Creek
East Fork Weiser R.
Fruitvale
Council
Middle Fork Weiser R.
Pine Creek
RIVER
Little Weiser River
C. BEN ROSS
RESERVOIR
Cambridge
MONDAY GULCH
RESERVOIR
PROPOSED
Mann Creek
Midvale
WEISER
Crane Creek
CRANE CREEK
RESERVOIR
GALLAWAY
CANAL
WEISER
SNAKE RIVER
WATER SUPPLY & WATER QUALITY CONTROL STUDY
WEISER RIVER DIVISION
COUNCIL and MAIN WEISER UNITS
S.W. IDAHO WATER DEVELOPMENT PROJECT
SCHEMATIC DIAGRAM
UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration
N.W. REGION (DATE: 4/66) PORTLAND, OREGON

FIGURE 2

TABLE V-1

WATER QUALITY DATA
Weiser River Near Mouth RM 352-0.5
Highway 30N Bridge in Weiser, Idaho

	8/22/61	8/24/61	8/24/61	1/16/62
pH	8.7	8.8	7.8	8.2
Temp ^{o}C	27	25	23	1.0
DO mg/l	10.6	9.3	5.3*	13.6
BOD mg/l	2.6	3.1	-	2.1
MPN/100ml	>1,100	11,000	-	910
PO_4 mg/l	0.108	0.316	-	0.10
NO_3-N mg/l (as nitrogen)	0.59	0.34	-	0.34
TS, mg/l	314	314	-	143
Turbidity	29	26	-	4
Color	20	20	-	4
Alkalinity mg/l	142.0	137.5	-	66
Hardness mg/l	125	132	-	68
Conductivity mho's	355	360	-	150

* Nocturnal sample.

The fact that the total organic waste load is estimated to be about 1,000 population equivalents, combined with the fact that the stream supports excellent trout populations--where sufficient flow is available--lends pragmatic support for deductions concerning the adequacy of the biological quality of the stream to meet established uses.

Chemical water quality data are presented in TABLE V-2:

TABLE V-2

REPRESENTATIVE ANALYSES OF SURFACE WATERS
WEISER RIVER BASIN, IDAHO

Analyses	Little Weiser River near Indian Valley		Middle Fork Weiser River Near Council		Weiser River near Cambridge		Weiser River near Tamarack		Weiser River near Weiser		Crane Creek near Weiser		Pine Creek near Cambridge	
Date	2/10/59	4/27/59	7/22/58	2/11/59	4/6/58	4/27/59	2/11/59	4/27/59	5/7/48 to 10/4/48	11/12/58 to 9/29/59	2/10/59	4/27/59	2/11/59	4/27/59
Sampling Frequency[1/]	--	--	--	--	H	H	--	H	D	M	--	--	--	H
Number of Samples	1	1	1	1	1*	1	1	1	10**	10	1	1	1	1
Discharge, cfs	--	--	--	--	530	1,640	16	224	1,151	--	8.2	6	16	42
Silica (SiO_2), ppm	28	26	--	26	--	25	28	25	--	27	48	34	30	29
Calcium (Ca), ppm	11.0	8.0	--	9.0	17.6	7.4	11.0	7.0	13.4	11.6	23.0	23.0	14.0	12.0
Magnesium (Mg), ppm	4.6	2.67	--	3.52	4.01	1.70	4.25	1.82	5.71	4.01	11.06	11.55	3.53	2.43
Sodium (Na), ppm	3.45	2.99	5.06	5.29	4.60	3.22	4.14	2.76	6.44	6.44	19.0	20.93	4.14	3.68
Potassium (K), ppm	1.17	1.17	--	1.17	2.34	1.17	1.17	1.17	6.24	2.34	6.24	6.24	1.56	1.95
Bicarbonate (HCO_3), ppm	64	47	52	55	78	41	54	37	69	65	144	141	73	61
Sulfate (SO_4), ppm	1.44	0.96	--	3.84	0.96	1.44	0.96	0.48	8.16	3.84	15.84	19.20	1.44	0.96
Chloride (Cl), ppm	0.35	0.35	--	1.05	0.35	0.00	0.00	1.42	8.87	1.06	7.10	9.94	0.35	0.35
Fluoride (F), ppm	0.19	0.19	--	0.19	--	0.38	0.19	0.19	--	0.38	0.38	0.38	0.19	0.19
Nitrate (NO_3), ppm	0.00	0.62	--	0.00	0.00	0.00	0.00	0.62	--	0.62	0.62	0.00	0.62	0.00
Dissolved Solids[2/], ppm	80	65	--	73	--	68	82	61	100	100	208	202	95	84
Specific Conductance [3/]	107	80	87	98	--	71	102	63	--	119	286	296	125	101
pH	7.6	7.1	7.1	7.4	7.6	7.3	7.3	7.0	--	--	8.1	7.6	7.2	7.6
Hardness as $CaCO_3$, ppm--														
Calcium Magnesium	46	31	34	37	60	26	45	25	57	46	103	105	50	40
Non-Carbonate	0	0	0	0	0	0	0	0	0	0	0	0	0	0

1/ Sampling Frequency: H - High Flow; D - Daily; M - Monthly.
2/ Residue on evaporation at 180 °C.
3/ Micromhos at 25 °C.

* U. S. Bureau of Reclamation
** Idaho University Agricultural Experimental Station.

SOURCE: U. S. Geological Survey, Professional Paper 417-D, 1964.

B. Groundwater

Groundwater in the study area is primarily used for domestic and stock watering purposes. In general, the ground waters are of suitable quality for all common uses and for irrigation, as indicated by the ground water quality data presented in TABLE V-3.

TABLE V-3

REPRESENTATIVE ANALYSES OF GROUND WATER
WEISER RIVER BASIN, IDAHO

Chemical analyses of representative samples of ground water from the Midvale and Council areas, Idaho

[Analyses by U.S. Bureau of Reclamation. Chemical constituents in parts per million]

Well	Depth of well (feet)	Date of collection	Temperature (°F)	Calcium (Ca)	Magnesium (Mg)	Sodium (Na)	Potassium (K)	Bicarbonate (HCO_3)	Carbonate (CO_3)	Sulfate (SO_4)	Chloride (Cl)	Nitrate (NO_3)	Boron (B)	Dissolved solids, sum of determined constituents	Residual sodium carbonate (meq/l)	Sodium-adsorption ratio (SAR)	Hardness as $CaCO_3$	Specific conductance (micromhos at 25°C)	pH
17N-1W-34dd1	120	5-24-62	[1]51	17	7.8	8.7	2.7	109	0.0	4.3	1.4	Trace	0.01	95	0.29	0.41	73	156	[illegible]
16N-1W-24bd1	135	do	[1]51	13.6	5.1	5.3	1.6	79	.0	1.4	.0	0.2	.01	66	20	.31	53	120	[illegible]
10db1	401	5-23-62	[1]51	11.2	7.4	21.6	4.7	85	.0	31.7	8.5	.0	.03	130	.08	1.16	60	210	[illegible]
14bc2	381	do	60	10	4.4	12.4	3.9	83	.0	1.4	.0	.0	.01	73	.54	.85	43	140	[illegible]
11N-1W-36dd1	178	5-22-62	56	6.6	4.3	21.4	11.7	115	.0	5.3	.7	.0	.04	110	1.20	1.83	33	170	[illegible]
14N-3W-19cb2	Spring	do	120	7.8	1.5	74	3.1	56	2.4	165	16	Trace	.52	258	.48	6.22	25	364	[illegible]
19dd1	35	do	[1]57	16.8	3.3	13.3	3.9	95	.0	1.4	1.1	1.2	.00	88	.45	.78	52	136	[illegible]
13N-3W-6bb1	357	do	56	6.6	3.6	14.3	10.9	85	.0	4.8	.7	.0	.01	83	.62	1.11	30	130	[illegible]
8bd1	32	do		41	24	24	4.7	209	.0	3.8	2.5	Trace	.01	217	.84	.78	203	430	[illegible]
8cc3	252	5-21-62	68	5.0	1.6	71	13.3	200	2.4	10.1	3.9	.0	.00	286	2.9	7.03	19	333	[illegible]
10cd1	93	5-22-62	54.5	37	19.5	22.1	3.9	237	.0	7.2	4.6	9.3	.01	273	.46	.71	162	380	[illegible]

[1] Not true ground-water temperature.

SOURCE: U. S. Geological Survey, Water Supply Paper 1779-Q.

VI. THE ECONOMY

A. General

The demand for water for M&I purposes, and the amount and character of waste waters resulting from such uses are determined largely by the activities associated with a region's economic base. The purpose of this section is to present economic and demographic data for use in projecting the needs for water for M&I purposes and for estimating the future amounts and types of waste material that may be expected to enter stream waters of the Weiser River Basin.

B. Present

1. Economic Activities

The economy of the study area is predominantly agricultural. Lumbering is carried out in the northern portion of the area and a sawmill is located in Council. Agriculture, however, provided 31.3 percent of the total employment in 1960 and may be presumed to be the principal source of support for service industries. Changing agricultural patterns have imposed shifts on the regional economy. Increasing concentration of farm ownership and greater attention to the grazing of cattle and sheep have resulting in a shift in the nature of farming and a sharp rise in productivity. Between 1954 and 1959, the value of agricultural products sold rose 42.2 percent; yet, between 1950 and 1960, farm employment fell 24.6 percent in the two-county area. The production of oats, field seeds, potatoes, sugar beets, berries, and vegetables (largely corn and dry onions) has increased, while production of wheat, barley, dairy products, and poultry products has declined. Wheat remains the chief crop of the area, but sugar beets and potatoes are nearly as large in terms of value of crops sold.

TABLE VI-1 lists employment provided by various industries and reflects emphasis on agriculture in the region's economy.

TABLE VI-1
1960 EMPLOYMENT, BY INDUSTRIAL GROUPS
ADAMS & WASHINGTON COUNTIES, IDAHO

Industry	Adams County		Washington County	
	Number Employed	Percent of Labor Force	Number Employed	Percent of Labor Force
Agriculture	302	25.8	1,019	30.8
Forestry & Fisheries. . . .	29	2.5	4	0.1
Construction.	63	5.4	176	5.3
Manufacturing	155	13.3	320	9.7
Transportation, Utility, Communication	26	2.2	188	5.7
Wholesale & Retail Trade. .	178	15.3	573	17.4
Finance, Insurance, Real Estate	20	1.7	47	1.4
Business & Repair Service .	8	0.7	66	2.0
Personal Service	61	5.2	175	5.3
Hospital & Medical Svc. . .	32	2.7	51	1.5
Education	38	3.2	214	6.5
Other Professional Svc. . .	39	3.3	92	2.8
Public Administration . . .	39	3.3	118	3.6
Industry, unclassified. . .	8	0.7	92	2.8
Total Employed.	998	85.6	3,135	95.1
Total Unemployed.	168	14.4	164	4.9
TOTAL LABOR FORCE	1,166	100.0	3,299	100.0

Source: U. S. Census of Population, 1960.

The town of Weiser (county seat of Washington County) is the largest of the four towns in the area and provides a major share of manufacturing and service employment, as indicated in TABLE VI-2.

TABLE VI-2
1960 WASHINGTON COUNTY EMPLOYMENT
PROVIDED BY WEISER, IDAHO

Industry	Percentage
Finance, Insurance, Real Estate	83.0
Personal Service	70.2
Public Administration	67.0
Wholesale & Retail Trade	66.8
Manufacturing	64.5
Professional & Related Service	61.0
All Employment	51.1

SOURCE: U. S. Census of Population, 1960.

Weiser has not developed a substantial manufacturing or processing industry. Most manufacturing units are small and their products are largely consumed or employed in the immediate area. Food processing is the chief manufacturing industry, with a flour mill, a bakery, a beverage bottling plant, a small freezing plant, and a producer of potato chips located in Weiser. Most of the region's agricultural output is routed to processing plants in nearby towns.

Cambridge and Midvale (located upstream from Weiser 31 and 23 highway miles, respectively) are largely service centers for the agricultural countryside. Council (the county seat and largest community in Adams County) is somewhat larger than Cambridge or Midvale. It serves as both an agricultural service center and as the focus of regional lumbering, being the location of a Boise Cascade Corporation sawmill and three logging firms.

2. Population

About 75 percent of the population of Idaho's Washington and Adams Counties is contained in the Weiser River Basin. Population is concentrated in four towns--Weiser, Midvale and Cambridge in Washington County and Council in Adams County--whose moderate growth has kept the area's population nearly static over the last two decades, in spite of considerable reduction of rural population. TABLE VI-3 indicates the distribution and trend of population in the area.

TABLE VI-3
POPULATION TRENDS
WEISER RIVER BASIN, IDAHO

Area	Population			Change (%)
	1940	1950	1960	1940-60
Weiser	3,664	3,961	4,208	+14.8
Midvale	262	231	211	-19.5
Cambridge	405	354	473	+14.4
Council	692	748	827	+19.5
Total Urban Population	5,023	5,294	5,719	+13.8
Rural Population 1/	3,831	3,461	3,175	-17.0
TOTAL POPULATION	8,854	8,755	8,894	+0.45

1/ Rural populations for 1940 & 1950 represent the populations of nine census districts, less the populations of four townships. For 1960, the figure is derived by subtracting town populations and a portion of Washington & Adams Counties' 1950-1960 population loss similar to the region's 1940-1950 population loss.

SOURCE: U. S. Census of Population, 1950 & 1960.

C. Future Economic Growth

Relying largely on agriculture for its economic livelihood, the basin's future development must be related to the evolution of atriculture in the Central Snake River area. Development of a substantial manufacturing industry seems most unlikely. The area is not favorably oriented to major markets for heavy manufacturing industries. The presently known mineral resources offer little prospect of intensive exploitation. The absence of educational and cultural resources generally associated with industries employing advanced technology precludes likelihood of establishment of science-based industries.

Increased irrigated agriculture might partially arrest the declining trend of rural population. Preliminary estimates by the Bureau of Reclamation indicate that the long-range effect of proposed projects will be to stabilize the rural population at about the present level. It is likely that food-processing activities in the town of Weiser may experience moderate expansion in the future as a side-effect of irrigation developments, but it is anticipated that existing plants elsewhere will be able to process most additional output.

Lumbering may be expected to provide another source of growth in the northern part of the area. The area's timber resources are relatively marginal and should be brought into use as other supply sources are fully utilized.

A fourth possible source of growth is expanded recreational use of the Payette National Forest and nearby lakes and reservoirs. Distance from population centers, however, limits the impact of recreational opportunities.

The most likely course of development, then, would see a leveling off in the rate of decline of farm employment as a result of increased irrigation. Service industries and service employment may be seen to expand moderately as farm employment stabilizes and farm income rises. Food processing would appear to be the only likely source of more than the most modest growth of manufacturing to 1980. After 1980, lumbering may play an increasingly important role. Throughout the period, recreation may be expected to exert a slight but beneficial effect on service industries and employment.

D. Future Population

Neither the recent history of the area nor the design pattern of economic development outlined above suggests vigorous population growth during the study period. The forecast of population is based on several assumptions suggested by consideration of the evolving economic base:

(1) The rate of rural population decline will slow;

(2) Town population will grow as a function of the State's overall population growth and the growth in ratio of service employment to "goods" industry employment.

The forecast, for design purposes, of future population is shown in TABLE VI-4. The indicated population growth rate for the area is 0.6 percent a year or about half that projected for the State as a whole (X-5).

TABLE VI-4
PRESENT AND PROJECTED POPULATION
WEISER RIVER BASIN, IDAHO

Area	1960	1980	2000	2020
Rural Population	3,175	2,800	2,500	2,200
Communities	5,719	7,000	8,600	10,700
TOTAL	8,894	9,800	11,100	12,900

It is estimated that the major part of the population growth will occur in Weiser and Council. It must be recognized that this projection is for design purposes only; in a region so small and sparsely settled minor economic changes would be sufficient to upset such projections. For example, establishment of a moderate-sized factory in the area would create conditions for expansion of greater magnitude. Conversely, failure of new irrigation opportunities might be presumed to result in slower growth or even decline.

VII. WATER REQUIREMENTS
Municipal & Industrial

A. Present Water Use

At the present time water demands in the study area average approximately 1.0 mgd. Demands in the urbanized and rural areas amount to about 0.7 mgd and 0.3 mgd, respectively.

The Weiser water supply is obtained from two wells (rated at 0.75 mgd each). An auxiliary supply, with filtration, is available on the Snake River for emergency purposes. Officials of the City of Weiser have indicated in the past that their well supplies barely meet peak demands. Indications of late are that an influx of sand into the wells has caused operating problems during summer runoffs.

The City of Midvale has an adequate water supply in both quantity and quality. An artesian well has been developed which provides 700 to 750 gallons per minute (gpm) of good quality water. This is far in excess of any foreseeable needs for Midvale.

The Cambridge water supply is adequate in both quantity and quality. An artesian well provides about 350 gpm of good quality water. An additional well is also available which provides about 110 gpm. This provides a margin of 150 gpm over the estimated peak demand of 300 gpm, which should provide for any foreseeable future needs. If necessary, additional underground sources would provide the most economical supply of additional water.

The City of Council obtains its water supply from two wells. One of the wells was recently deepened an additional 400 feet. Prior to the deepening of the well, it had been necessary to curtail the use of municipal water for irrigation during peak-demand periods. The potential supply from a new well has not been accurately determined, but it appears to give Council an additional 160 gpm of water supply.

B. Forecast of Future Needs

Projected future water demands for the study area are shown in TABLE VII-1.

TABLE VII-1
PROJECTED WATER DEMAND
WEISER RIVER BASIN, IDAHO

Location	Water Demand - Average mgd* 1980	2000	2020
Weiser	0.77	1.10	1.60
Midvale	0.04	0.05	0.06
Cambridge	0.08	0.10	0.12
Council	0.14	0.17	0.22
Rural Area	0.28	0.25	0.22
TOTAL	1.31	1.67	2.22

* Peak daily demand is about 225 percent of average demand.

It is expected that ground water supplies, with the possible exception of Weiser, will continue to be available in adequate quantity and quality to meet the projected future demand for municipal and industrial supply in the study area. Alternative supply improvement possibilities at Weiser appear to be (1) to expand groundwater facilities, (2) to refurbish and update the present facilities on the Snake River, (3) to use the Weiser River and provide treatment facilities or, (4) to request storage in a proposed upstream Federal reservoir and provide water transport and treatment facilities. A detailed engineering study, considering all possibilities for improvement should be made by the City of Weiser at the earliest possible time.

VIII. WATER QUALITY CONTROL

A. Need for Control

The waters of the Weiser River Basin are used for a variety of purposes which include irrigation, fish and wildlife, recreation, stock watering, and disposal of organic wastes. Irrigation is the major water use in the study area and requires water free of chemical constituents which are harmful to crops and soils. Although Brownlee and Oxbow Dams on the main stem of the Snake River have eliminated the anadromous fish runs in the Weiser River Basin, a sizeable fresh-water trout fishery exists in the upper basin. Recreational activities in the basin primarily involve fishing and boating.

B. Municipal, Industrial, & Agricultural Pollution

The Cities of Council (RM 64.2) and Cambridge (RM 50.3) contribute the only significant amounts of municipal waste to the Weiser River in the Council-to-Midvale reach. At the present time, approximately 1,000 PE of BOD are discharged to the river in this reach. Based on population projections (Chapter VI) and provision of adequate treatment (85 percent BOD removal), municipal wastes discharged to the Weiser River will be about 250, 290, and 330 PE by the years 1980, 2000, and 2020, respectively.

No significant M&I wastes are presently discharged or are expected to be discharged to the Weiser River below Midvale during the period of this study. Wastes produced by the City of Weiser are treated and discharged to the main stem of the Snake River.

Irrigation return flows may degrade Weiser River water quality to a slight degree as mineralization is promoted by leaching from irrigated lands. The very minor increase in TDS from headwaters to mouth and the river's ability to support high forms of aquatic life indicate, however, that mineralization does not constitute an identifiable problem.

C. Water Quality Criteria

On the basis of present and anticipated water uses, dissolved oxygen (DO) has been selected as the governing water quality indicator. To maintain the present level of quality, objectives for DO in the Weiser River were established at 7 mg/l. This level of DO would assist in maintaining an environment suitable for fish life and would provide adequate water quality for recreation and maintenance of the aesthetic value of the stream.

D. Flow Regulation

Sufficient streamflow, without specific provision for storage, is available in Weiser River to maintain suitable water quality under present and future waste loading conditions. Computations incorporating the future waste loads expected to be discharged after 85 percent BOD removal from municipal waste sources indicate that a minimum streamflow of 10 cfs from Council downstream to the mouth of the Weiser River would satisfy this water quality requirement. Since the recorded minimum daily flow for the Weiser River near Council is 22 cfs (June 20, 1940) and at Cambridge is 23 cfs (October 1, 1943), more than adequate flow is available in the river even under extreme low-flow conditions, for water quality control purposes. The Boise Regional Office of the USBR has indicated that, with both units of the proposed project in operation, minimum streamflow will continue to exceed 10 cfs. It is not necessary, then, to include storage for quality control in the proposed additions to the Weiser Division. It is recommended, however, that any future developments which anticipate additional diversions from the river recognize the need to maintain a minimum flow of at least 10 cfs.

IX. BENEFITS....Water Quality Control

In the Weiser River Basin study area there are no requirements for storage for water quality control, and no apparent damages to water quality will occur as a result of operations of the Weiser Division of the Southwest Idaho Water Development Project. No positive or negative benefits can be assigned to storage in the Weiser River.

X. BIBLIOGRAPHY

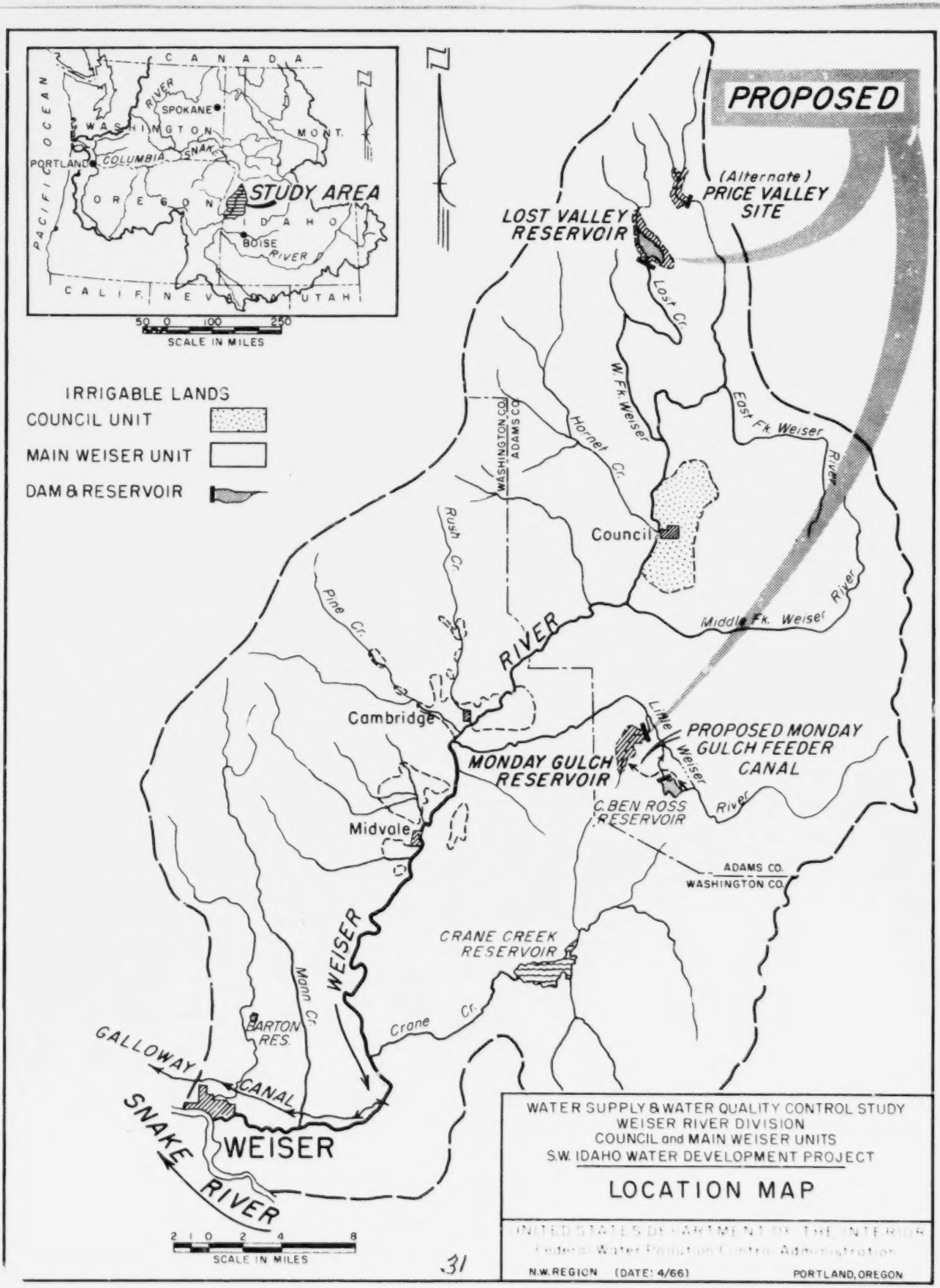
1. U. S. Geological Survey Water Supply Paper 1779-Q, Ground Water in the Midvale and Council Areas, Upper Weiser River Basin, Idaho - 1964.

2. L. B. Laird, U. S. Geological Survey Professional Paper 417-D, Chemical Quality of the Surface Waters of the Snake River Basin, 1964

3. USDHEW, Public Health Service, 1962 Inventory of Municipal Waste Facilities

4. USDHEW, Public Health Service, Region IX, Portland, Oregon, Water Resources Study, Weiser Project, Weiser River Basin, Idaho, March 1963.

5. Kerr Committee Report No. 5, Page 29, Series II, Migration Assumption No. 1 - Based on estimates for 1980 and 2000.



WATER SUPPLY & WATER QUALITY CONTROL STUDY
WEISER RIVER DIVISION
COUNCIL and MAIN WEISER UNITS
S.W. IDAHO WATER DEVELOPMENT PROJECT

LOCATION MAP

UNITED STATES DEPARTMENT OF THE INTERIOR
Federal Water Pollution Control Administration

N.W. REGION (DATE: 4/66) PORTLAND, OREGON